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(Non-tilting Type) [PGD 26: Weights and Measures]



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Indian Standard
SPECIFICATION FOR
LARGE METRIC CAPACITY CALIBRATING
MEASURES (NON-TILTING TYPE)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR LARGE METRIC CAPACITY CALIBRATING MEASURES (NON-TILTING TYPE)

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Indian Standard
 SPECIFICATION FOR
 LARGE METRIC CAPACITY CALIBRATING
 MEASURES (NON-TILTING TYPE)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 26 July 1963, after the draft finalized by the Commercial Weights and Measures Sectional Committee had been approved by the Engineering Division Council.

0.2 Measures up to and including 20 litres are covered by IS : 1058-1962 Specification for Commercial Metric Capacity Measures (*Revised*). For calibrating bulk vehicle tanks, meters and large filling measures, it is necessary to have large capacity calibrating measures. It was realized that Controllers of Weights and Measures would require these measures, and that in the interest of uniformity, an Indian Standard was called for. It was felt that such a standard giving essential constructional features would also assist in the manufacture of measures of reliable quality.

0.3 This standard, in addition to prescribing accuracies, prescribes the general features, which could be considered as bordering on design standardization. For the sake of uniformity, it was felt necessary to give guidance on design and construction of such measures.

0.4 This specification is one of a series of Indian Standards on commercial metric weights and measures.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960 Rules for Rounding Off Numerical Values (*Revised*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

0.6 This standard is intended chiefly to cover the technical provisions relating to large metric capacity calibrating measures (non-tilting type), and it does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This standard covers the requirements of large metric capacity calibrating measures of the stationary and portable types intended for use in checking commercial bulk measures, vehicle tanks, bulk meters, etc.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Capacity of Delivering Measure — The quantity of liquid that will be delivered by the delivering measure, when the measure is filled up to the nominal graduation mark, so that the bottom of the meniscus coincides with the top edge of the nominal graduation mark, and is emptied as described in 7.1.

2.2 Capacity of Measure Used as Container — The quantity of liquid that the measure will contain when it has been filled as described in 7.2 so that the bottom of the meniscus coincides with the top edge of the nominal graduation mark.

3. DENOMINATIONS

3.1 The calibrating measures shall be of the following denominations:
50, 100, 200, 500, 1 000, 1 500, 2 000, and 5 000 litres

4. FORMS, DIMENSIONS AND TOLERANCES

4.1 Calibrating measures shall be vertical cylinders fitted between conical ends and generally of the form shown in Fig. 1. The dimensions shall be as given in Table 1. The maximum neck heights shall be 400 mm for all calibrating measures. The full capacity mark of the measure shall be marked by the manufacturer on the neck so as to conform to 6.3.

4.2 The permissible error in the capacity of the measure shall be ± 0.1 percent of the capacity of the measure.

5. MATERIAL

5.1 The body of the measure shall be made of mild steel plate. The neck shall be made of mild steel pipe or plate. The thickness of the plate, of which the measure is made, shall be as follows:

<i>Capacity</i>	<i>Minimum Thickness</i>
Up to and including 500 litres	1.8 mm
1 000 and 1 500 litres	2.5 mm
2 000 and 5 000 litres	4.0 mm

6. CONSTRUCTION

6.1 The measures shall be of fully welded construction, all welds being external and continuous with good penetration and free from scale. All interior joints shall be smooth and free from projections.

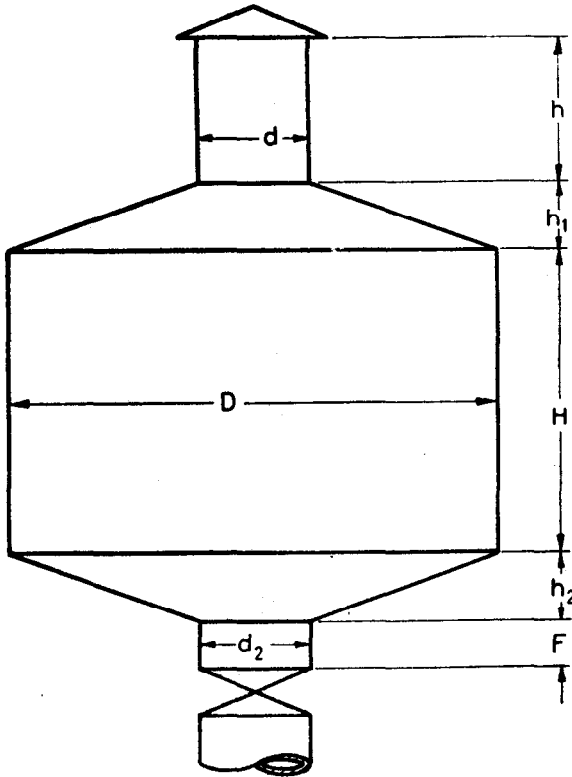


FIG. 1 DIMENSIONS OF THE CALIBRATING MEASURE

TABLE 1 DIMENSIONS OF LARGE METRIC CAPACITY CALIBRATING MEASURES

(Clause 4.1 and Fig. 1)

All dimensions in millimetres.

CAPACITY litres	D	H	d	h	h ₁	h ₂	F	d ₂ (Nominal)
50	440	273	100	400	62	62	40	100
100	540	368	125	400	76	80	50	100
200	680	464	200	400	88	105	60	100
500	920	637	300	400	113	149	75	100
1 000	1 160	801	400	400	138	193	90	100
1 500	1 330	915	500	400	151	222	98	100
2 000	1 480	979	600	400	160	250	105	100
5 000	2 020	1 311	1 000	400	186	350	125	100

NOTE — Tolerances on dimensions ± 5 percent.

6.2 Measures shall be free from surface defects and indentations. External surfaces shall be painted and the internal surfaces lined with a good quality resistant coating, such as epoxy resin.

6.3 The top neck shall be provided with a gauge glass or a glass window or an overflow pipe to ascertain the correct capacity measure. The gauge glass or glass window shall have a suitably graduated scale marked on it. The scale shall cover ± 0.1 percent of the capacity of the measure from the point of the full capacity mark of the measure.

6.4 Measures shall be provided with a filling pipe having its lower end close to the bottom of the measure.

6.5 A baffle plate shall be fitted above the outlet of the measure to minimize turbulence and prevent liquid swirl and vortex formation. Baffles shall be so designed that they do not trap air or liquid during filling and emptying operations nor impede the flow of liquid.

6.6 The outlet valve shall be so constructed that the measure is completely emptied.

6.7 A measure permanently installed shall be supported by a structure secured to the ground. A typical installation of a calibrating measure for calibrating meters is shown in Fig. 2, and an arrangement for calibrating bulk vehicle tanks is shown in Fig. 3.

6.8 The portable measure supported by legs shall be provided with sufficient screw jacks permanently attached to the base of the cradle to enable it to be levelled in two planes. The measures shall be provided with two spirit levels at right angles to each other.

6.9 One or two adjusting devices shall be provided on the measure. A typical device is shown in Fig. 2. The device shall be capable of positive adjustment and should be self-locating. It shall be locked by a lock nut or set screw. It shall have a total range of adjustment equivalent to a quantity ± 0.5 percent of the capacity of the measure.

6.10 Suitable sealing arrangements shall be provided to seal the adjusting device and the scales, if these are adjustable. Lugs shall be provided on the measure to facilitate sealing.

6.11 A manhole or hand hole shall be provided on the body of the measure as shown in Fig. 2 to enable entry into the measure for purposes of internal painting and to carry out internal inspection, if required.

7. CALIBRATION PROCEDURE

7.1 Calibrating Measure Calibrated for Delivery

7.1.1 The calibrating measure shall be clean, free from rust and grease, and shall be tested for leaks with water.

7.1.2 The measure shall be filled with water up to the full capacity mark on the gauge glass or until it overflows into the overflow pipe. The content shall then be withdrawn by opening the outlet valve and collected in a precalibrated measure of suitable size. When the entire contents of the tank have been collected and measured, it is possible to know, to what extent the capacity is more or less than the correct capacity. The necessary adjustment is then made with the adjusting device and the procedure repeated until the capacity is correct within the permissible tolerances. If an adjustable scale has been provided, it may be used for final adjustment. The adjustment device and the movable scale shall then be sealed.

7.2 Calibrating Measure Calibrated for Content

7.2.1 The calibrating measures shall be clean, free from rust and grease, and shall be tested for leaks with water.

7.2.2 Measured quantities from a test measure are poured until the level of the water reaches the full capacity mark on the sight glass. The difference between the volume of water filled and the correct capacity is calculated and the necessary adjustment made with the adjusting device. The procedure is repeated until the calibrating measure fills correctly to the full capacity mark or just begins to overflow. If an adjustable scale has been provided, it may be used for finer adjustments. The adjusting device and the adjustable scale shall then be sealed.

8. MARKING

8.1 Each measure shall have the capacity and manufacturer's name or trade-mark clearly and indelibly marked on it. The denominations shall be marked in Hindu-Arabic numerals.

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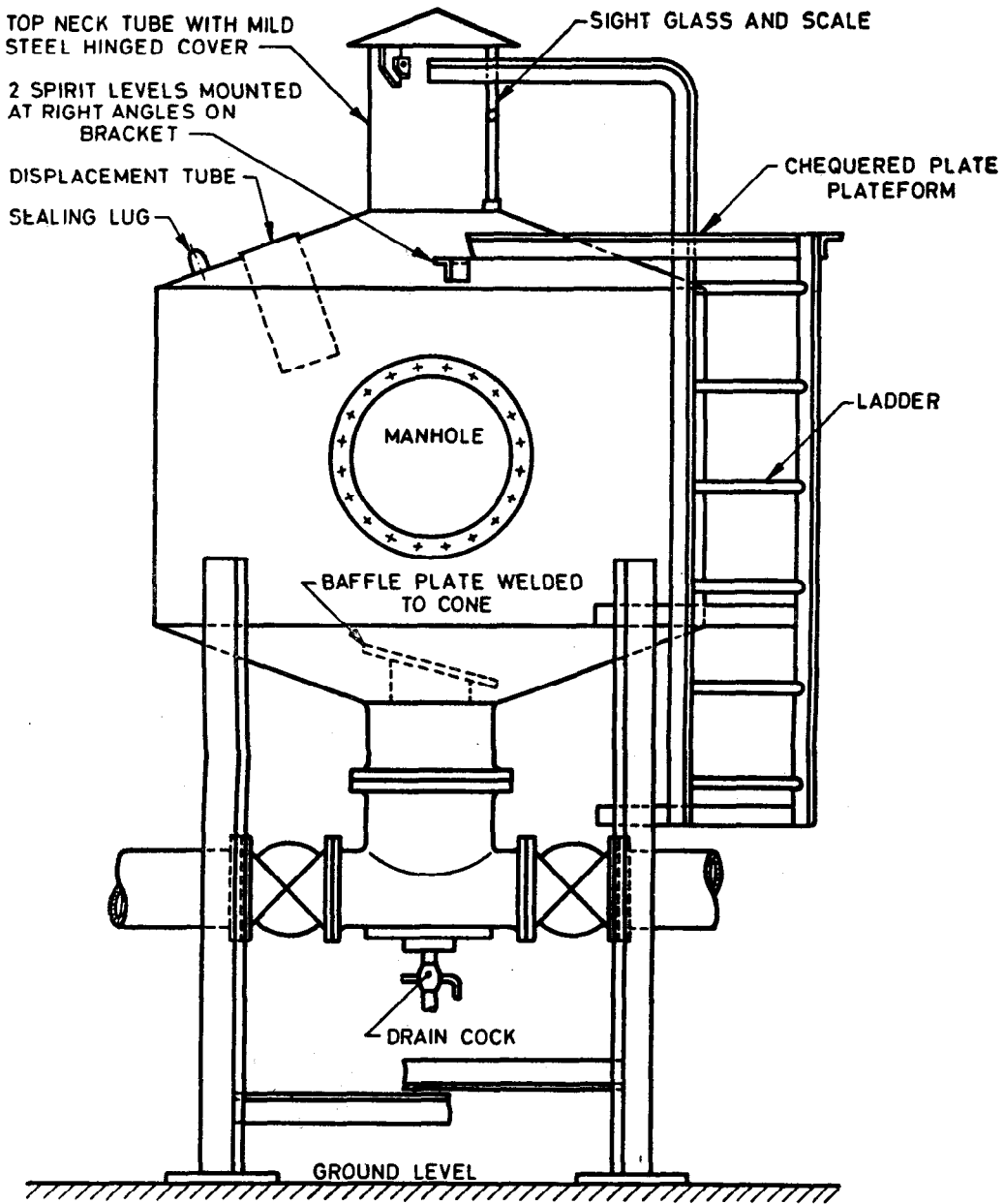


FIG. 2 LARGE CAPACITY CALIBRATING MEASURE: TYPICAL INSTALLATION FOR CALIBRATING METERS

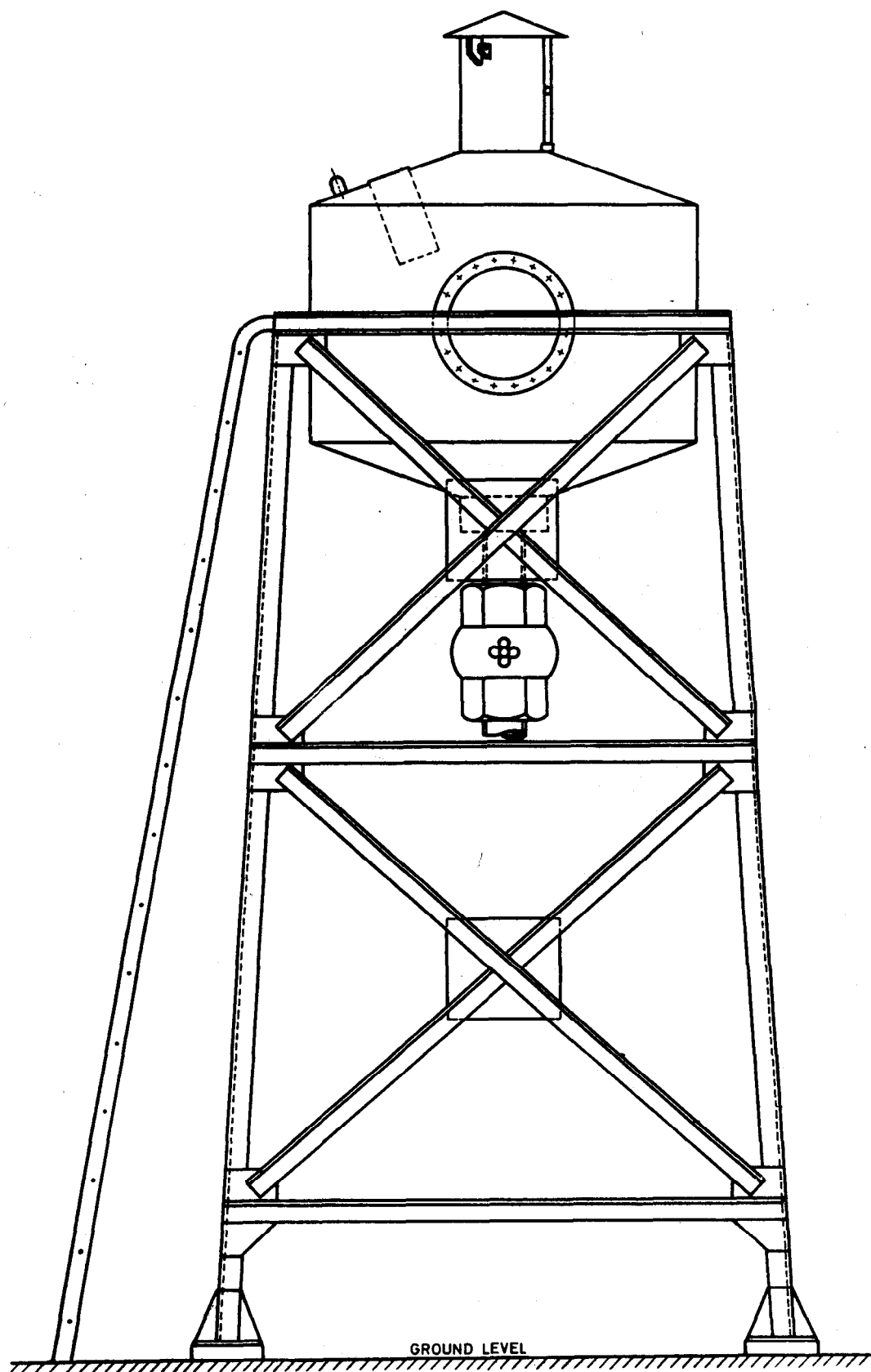


FIG. 3 LARGE CAPACITY CALIBRATING MEASURE : TYPICAL INSTALLATION FOR CALIBRATING BULK VEHICLE TANKS

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